Claims

1. A valve stem for use with a metering valve, said valve stem comprising an elongate stem element having an elastomeric sleeve molded onto at least a portion thereof and a sealing element having an inner surface, said sealing element being affixed onto the elongate stem element, such that at least a portion of the inner surface of the sealing element is overlying at least a portion of the elastomeric sleeve.

2. A valve stem according to claim 1, wherein the elongate stem element is made of a metal or a material comprising a polymer.

3. A valve stem according to claim 2, wherein the elongate stem element is made of a material comprising a polymer and the elastomeric sleeve is co-molded onto at least a portion of the elongate stem element.

4. A valve stem according to any preceding claim, wherein the elongate stem element is made of a material comprising a thermoplastic polymer.

5. A valve stem according to any preceding claim, wherein the elastomeric sleeve is made of a material comprising a thermoplastic elastomer.

6. A valve stem according to any preceding claim, wherein the sealing element is elastomeric.

7. A valve stem according to any preceding claim, wherein the sealing element is made of a material comprising a thermoplastic elastomer or thermoset elastomer.

8. A valve stem according to claim 6, wherein the sealing element is made of a material comprising a thermoset elastomer selected from EPDM, nitrile, butyl rubber, chlorobutyl rubber, bromobutyl rubber and neoprene.

9. A method of manufacturing a valve stem for use with a metering valve, said valve stem comprising an elongate stem element, an elastomeric sleeve and a sealing element, said method comprising the steps of:

a) providing an elongate stem element;

b) providing a mold shape containing at least in part the elongate stem element;

c) molding a material to form the elastomeric sleeve, such that the elastomeric sleeve is molded onto at least a portion of the elongate stem element; and

d) affixing the sealing element onto the elongate stem element, such at least a portion of the inner surface of the sealing element is overlying at least a portion of the elastomeric sleeve.

10. A method of manufacturing a valve stem according to claim 9, wherein said mold shape and said material is the second mold shape and second material; wherein the elongate stem element made of a first material comprising a polymer and step a) of providing an elongate stem element comprising the steps of:

i) providing a first mold shape;

ii) molding a first material to form the elongate stem element,

and wherein in step c) molding is performed, such that the elastomeric sleeve is co-molded onto at least a portion of the elongate stem element.

11. A method of manufacturing a valve stem for use with a metering valve, said valve stem comprising an elongate stem element, said elongate stem element made of a first material comprising a polymer, an elastomeric sleeve and a sealing element, said method comprising the steps of:

a) providing a second mold shape;

b) molding a second material to form the elastomeric sleeve;

c) providing a first mold shape underlying at least in part the elastomeric sleeve; and

d) molding a first material comprising a polymer to form the elongate stem element having the elastomeric sleeve co-molded onto at least a portion of said elongate stem element;

e) affixing the sealing element onto the elongate stem element, such at least a portion of the inner surface of the sealing element is overlying at least a portion of the elastomeric sleeve.

12. A method of manufacturing according to claim 10 or 11, wherein the step of molding elongate stem element is injection molding.

13. A method of manufacturing according to any one of claims 9 to 12, wherein the second material comprises a thermoplastic elastomer.

14. A method of manufacturing to any one of claims 9 to 13, wherein the step of molding the elastomeric sleeve is injection molding.

15. A metered dose dispensing valve comprising a valve stem according to any one of claims 1 to 8.

16. A metered dose dispensing valve according to claim 15, said valve being suitable for dispensing metered volumes of a pressurized aerosol formulation and wherein said valve further comprises a chamber and an outlet passage, wherein the valve stem extends into the chamber and is movable relative to the chamber between non-dispensing and dispensing positions, the valve stem having a configuration including an external surface and the chamber having an internal configuration including an internal surface such that a movable metered volume of pressurized aerosol formulation is capable of being defined therebetween and such that during the movement between its non-dispensing and dispensing positions the valve stem sequentially:

i) allows free flow of aerosol formulation into and out of the chamber;

ii) defines a closed metered volume for pressurized aerosol formulation between the external surface of the valve stem and internal surface of the chamber, and

iii) moves with the closed metered volume within the chamber without decreasing the volume of the closed metered volume until the metered volume communicates

with the outlet passage thereby allowing dispensing of the metered volume of pressurized aerosol formulation.

17. A metered dose dispensing valve according to claim 16, wherein said valve stem a second elastomeric sleeve, said second elastomeric sleeve molded onto at least a portion thereof, and a second sealing element, said second sealing element having an inner surface and being arranged and affixed onto the elongate stem element, such that at least a portion of the inner surface of the sealing element is overlying at least a portion of the elastomeric sleeve, and being longitudinally spaced from the first sealing element, each sealing element having a sealing surface capable of forming a gas-tight seal with the internal surface of the chamber.

18. A metered dose dispenser comprising a container equipped with a metered dose dispensing valve according to any one of claims 15 to 17.

19. A metered dose dispenser according to claim 18, wherein the container contains a medicinal aerosol formulation.

20. A metered dose dispenser according to claim 19, wherein the medicinal aerosol formulation comprises a medicament and a propellant selected from 1,1,1,2-tetrafluoroethane, 1,1,1,2,3,3,3-heptafluoropropane and a mixture thereof.

21. A metered dose dispenser according to claim 20, wherein the formulation further comprises ethanol.